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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/759,492	01/16/2004	Edward Hosung Park	03-0051	7681

29293 7590 07/28/2008

FREUDENBERG-NOK GENERAL PARTNERSHIP
LEGAL DEPARTMENT
47690 EAST ANCHOR COURT
PLYMOUTH, MI 48170-2455

EXAMINER	
DANIELS, MATTHEW J	

ART UNIT	PAPER NUMBER
1791	

NOTIFICATION DATE	DELIVERY MODE
07/28/2008	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/759,492	PARK, EDWARD HOSUNG	
	Examiner	Art Unit	
	MATTHEW J. DANIELS	1791	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *05 May 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-43* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-43* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *5/5/08*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 5 May 2008 has been entered.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. **Claims 1, 4, 9-11, 13-16, 18, 19, 35, and 40** are rejected under 35 U.S.C. 103(a) as being unpatentable over Ozawa (US 5910544) in view of McMahon (US 3432373). **As to Claims 1, 10, and 35**, Ozawa teaches dynamically vulcanizing (20:30-32) a mixture which may contain a fluoro-rubber (32:5-10), which is interpreted to be a fluoroelastomer, and a thermoplastic (19:45-20:9, 30:46-31:33) placed in a first port of a mixing machine (36:28-33), adding a curing agent (28:65) in a second downstream port (36:34-37) and mixing at a temperature above the melting point of the thermoplastic (20:43-45) for a time period which would form a partially cured thermoplastic vulcanizate (20:45-50, 1:38). Since the degree of vulcanization would be a result

effective variable selected by the ordinary artisan (20:45-50), one would have found it obvious to optimize this quantity to arrive at the T90 or less through routine experimentation. The partially cured material is extruded from an extruder (26:47-54) and may be subsequently placed on a substrate with an adhesive (26:58-64) and fully cured (52:35-45).

It is unclear whether Ozawa expressly teaches to place the partially cured material on a substrate with an adhesive and subsequently fully cure. However, in view of Ozawa's teaching to separately perform each of these steps, it is submitted that it would have been obvious to combine them together into one process. As evidence or further teaching that it is obvious to do so, McMahon teaches applying partially cured rubber material (2:59-60) onto a substrate with an adhesive (3:1-2) and performing a final cure of the laminate (3:20-45).

It would have been prima facie obvious to one of ordinary skill in the art at the time of the invention to incorporate the method of McMahon into that of Ozawa because (a) McMahon suggests the process for use with partially cured rubber, which is present in the Ozawa vulcanizate, or (b) Ozawa suggests each of the process steps demonstrated by McMahon, namely use of an adhesive on a substrate, application of an elastomeric or rubber material, and final curing.

As to Claim 4, Ozawa teaches that the substrate may comprise reinforcing fibers (21:65-22:3) such as polyamides, nylons, and polyesters, which are plastics. **As to Claims 9, 18, and 40,** Ozawa teaches a peroxide curing agent (28:65). **As to Claim 11**, it is generally obvious to make a batch process continuous, and particularly in the case where Ozawa uses a screw extruder, it would have been obvious to perform the process continuously. **As to Claim 13**, it is submitted that the particular crosslinking time disclosed by Ozawa (20:45-50) reads on the

claimed invention, and in the alternative, it would have been obvious to optimize the curing time to arrive at the claimed condition. **As to Claims 14-16 and 41-43**, Ozawa teaches that in a dynamic mixing process, many thermoplastics may be used interchangeably, including fluoroplastics (23:47-49, ETFE), non-fluorinated (23:20-43), and partially fluorinated thermoplastics (PVDF, 23:44-45). **As to Claim 19**, Ozawa teaches placing an adhesive on a solid support, and the thermoplastic elastomer composition is placed onto the adhesive (26:58-64). Additionally or alternatively, McMahon suggests that these steps are conventional (2:59-60, 3:20-45).

3. **Claims 2, 3, 20, and 36** are rejected under 35 U.S.C. 103(a) as being unpatentable over Ozawa (US 5910544) in view of McMahon (US 3432373), and further in view of Eisinga (US 5792348). Ozawa and McMahon teach the subject matter of Claim 1 above under 35 USC 103(a). **As to Claims 2, 3, 20, and 36**, Ozawa is silent to "insertion molding" onto a metal substrate. However, Eisinga teaches that it is known to insert mold onto a steel plate (2:8-17), which is a metal insert placed in a mold, reading on "insertion molding". It would have been prima facie obvious to one of ordinary skill in the art at the time of the invention to incorporate the method of Eisinga into that of Ozawa because (a) Ozawa suggests that the thermoplastic elastomer should be incorporated with other materials in a composite structure, and Eisinga provides one method for incorporating the materials of Ozawa into composite structures, or (b) Ozawa provides the PVDF material suggested by Eisinga.

4. **Claims 5-7, 21, and 37** are rejected under 35 U.S.C. 103(a) as being unpatentable over Ozawa (US 5910544) in view of McMahon (US 3432373), and further in view of DeAntonis (EP 0132583 A2). Ozawa and McMahon teach the subject matter of Claim 1, 10, and 35 above under 35 USC 103(a). **As to Claims 5-7, 21, and 37**, Ozawa suggests extrusion of a mixture that is interpreted to be at least partially cured, but Ozawa does not specifically teach "co-extrusion" of the adhesive and the partially cured thermoplastic vulcanizate by a liquid continuous injection unit. However, DeAntonis teaches applying and bringing layers together by co-extrusion of a plastic material, adhesive, and substrate (page 4). Although the device is not specifically described as a "liquid continuous injection unit", it is submitted that because the layers are "molten" (page 4, line 31) and may be cast onto rolls (page 15, line 35), that the device of DeAntonis is a liquid continuous injection unit. It would have been prima facie obvious to one of ordinary skill in the art at the time of the invention to incorporate the method of DeAntonis into that of Ozawa because (a) Ozawa suggests extrusion of polyvinylidene fluoride, which is provided by DeAntonis, and (b) incorporating the substrate of DeAntonis would maintain the excellent chemical resistance of the fluoropolymer but allow minimization of the amount of fluoropolymer used by providing only a surface layer (page 3, top half).

5. **Claims 8, 17, and 39** are rejected under 35 U.S.C. 103(a) as being unpatentable over Ozawa (US 5910544) in view of McMahon (US 3432373), and further in view of Kolb (USPN 3884877). Ozawa and McMahon teach the subject matter of Claim 1, 10, and 35 above under 35 USC 103(a). **As to Claim 8, 17, and 39**, Ozawa is silent to the bisphenol curing agents. However, Kolb teaches that when curing fluoroelastomers (title) of vinylidene fluoride (4:55-

56), it is known to use a bisphenol curative (8:63-69, 8:37-50). It would have been prima facie obvious to one of ordinary skill in the art at the time of the invention to incorporate the method of Kolb into that of Ozawa because (a) Ozawa suggests that a curing agent is needed, and Kolb teaches that bisphenols are very useful (8:69) for curing fluoroelastomer compositions (title), particularly vinylidene fluoride (4:55-56), or (b) doing so would provide the ability to vary the curing time and temperature (9:22-25).

6. **Claims 12 and 38** are rejected under 35 U.S.C. 103(a) as being unpatentable over Ozawa (US 5910544) in view of McMahon (US 3432373), and further in view of Yokokawa (USPN 4094949). Ozawa and McMahon teach the subject matter of Claim 1, 10, and 35 above under 35 USC 103(a). **As to Claims 12 and 38**, Ozawa appears to be silent to the claimed copolymer, however, Yokokawa teaches copolymers of vinylidene fluoride (2:25-35, 4:41). It would have been prima facie obvious to one of ordinary skill in the art at the time of the invention to incorporate the method of Yokokawa into that of Ozawa because one of ordinary skill in the art would have viewed the materials disclosed in the similar method of Yokokawa as substitutable alternatives for those already disclosed by Ozawa.

7. **Claims 22-25, 28** are rejected under 35 U.S.C. 103(a) as being unpatentable over Ozawa (US 5910544) in view of DeAntonis (EP 0132583 A2) and McMahon (US 3432373). **As to Claim 22**, Ozawa teaches dynamically vulcanizing (20:30-32) a mixture which may contain a fluoro-rubber (32:5-10), which is interpreted to be a fluoroelastomer, and a thermoplastic (19:45-20:9, 30:46-31:33) placed in a first port of a mixing machine (36:28-33), adding a curing agent

(28:65) in a second downstream port (36:34-37) and mixing at a temperature above the melting point of the thermoplastic (20:43-45) for a time period which would form a partially cured thermoplastic vulcanizate (20:45-50, 1:38). Since the degree of vulcanization would be a result effective variable selected by the ordinary artisan (20:45-50), one would have found it obvious to optimize this quantity to arrive at the T90 or less through routine experimentation. The partially cured material is extruded from an extruder (26:47-54) and may be subsequently placed on a substrate with an adhesive (26:58-64) and fully cured (52:35-45).

Ozawa is silent to the coextrusion of the partially cured vulcanizate with a substrate and it is unclear whether Ozawa expressly teaches to place the partially cured material on a substrate with an adhesive and subsequently fully cure. However, these aspects of the invention would have been obvious for the following reasons:

DeAntonis teaches applying a thermoplastic material onto a substrate by co-extrusion (page 4) and McMahon teaches applying partially cured rubber material (2:59-60) onto a substrate with an adhesive (3:1-2) and performing a final cure of the laminate (3:20-45).

It would have been prima facie obvious to one of ordinary skill in the art at the time of the invention to incorporate the methods of DeAntonis and McMahon into that of Ozawa because (a) McMahon suggests the process for use with partially cured rubber, which is present in the Ozawa vulcanizate, or (b) Ozawa suggests each of the process steps demonstrated by McMahon, namely use of an adhesive on a substrate, application of an elastomeric or rubber material, and final curing, and (c) Ozawa suggests extrusion of the material and incorporation with a substrate, and coextrusion would have been an obvious alternative process known to the ordinary artisan for achieving this objective.

As to Claim 23, DeAntonis provides a co-extruded adhesive layer between the two materials (page 4), and one would be motivated to incorporate the adhesive in order to improve the bond between the materials. **As to Claim 24**, DeAntonis teaches a multimanifold dies (page 4, line 22) which would inject the molten material in a liquid phase. **As to Claim 25**, it is submitted that it would have been obvious over the method of Ozawa to perform the process of Claim 22 in a twin screw extruder (36:43, for example). **As to Claim 28**, Ozawa teaches peroxides (28:65).

8. **Claim 26** is rejected under 35 U.S.C. 103(a) as being unpatentable over Ozawa (US 5910544) in view of McMahon (US 3432373), DeAntonis (EP 0132583 A2), and further in view of Yokokawa (USPN 4094949). Ozawa, McMahon, and DeAntonis teach the subject matter of Claims 22 and 25 above under 35 USC 103(a). **As to Claim 26**, Ozawa appears to be silent to the claimed copolymer, however, Yokokawa teaches copolymers of vinylidene fluoride (2:25-35, 4:41). It would have been prima facie obvious to one of ordinary skill in the art at the time of the invention to incorporate the method of Yokokawa into that of Ozawa because one of ordinary skill in the art would have viewed the materials disclosed in the similar method of Yokokawa as substitutable alternatives for those already disclosed by Ozawa.

9. **Claim 27** is rejected under 35 U.S.C. 103(a) as being unpatentable over Ozawa (USPN 5910544) in view of McMahon (US 3432373), DeAntonis (EP 0132583 A2), and further in view of Kolb (USPN 3884877). Ozawa, McMahon, and DeAntonis teach the subject matter of Claims 22 and 25 above under 35 USC 103(a). **As to Claim 27**, Ozawa is silent to the bisphenol curing

agents. However, Kolb teaches that when curing fluoroelastomers (title) of vinylidene fluoride (4:55-56), it is known to use a bisphenol curative (8:63-69, 8:37-50). It would have been prima facie obvious to one of ordinary skill in the art at the time of the invention to incorporate the method of Kolb into that of Ozawa because (a) Ozawa teaches peroxide curing agents and fluororubbers, and Kolb teaches that bisphenols are very useful (8:69) for curing fluoroelastomer compositions (title), particularly vinylidene fluoride (4:55-56), therefore Kolb teaches a substitutable curing agent for the materials of Ozawa, or (b) doing so would provide the ability to vary the curing time and temperature (9:22-25).

10. **Claims 29-31 and 34** are rejected under 35 U.S.C. 103(a) as being unpatentable over Ozawa (USPN 5910544) in view of McMahon (US 3432373) and Eisinga (USPN 5792348). **As to Claim 29**, Ozawa teaches dynamically vulcanizing (20:30-32) a mixture which may contain a fluoro-rubber (32:5-10), which is interpreted to be a fluoroelastomer, and a thermoplastic (19:45-20:9, 30:46-31:33) which may be polyvinylidene fluoride (20:7) placed in a first port of a mixing machine (36:28-33), adding a curing agent (28:65) in a second downstream port (36:34-37) and mixing at a temperature above the melting point of the thermoplastic (20:43-45) for a time period which would form a partially cured thermoplastic vulcanizate (20:45-50, 1:38). Since the degree of vulcanization would be a result effective variable selected by the ordinary artisan (20:45-50), one would have found it obvious to optimize this quantity to arrive at the T90 or less through routine experimentation. The partially cured material is extruded from an extruder (26:47-54) and may be subsequently placed on a substrate with an adhesive (26:58-64) and fully cured (52:35-45).

Ozawa is silent to the insert molding onto an adhesive coated substrate and it is unclear whether Ozawa expressly teaches to place the partially cured material on a substrate with an adhesive and subsequently fully cure. However, these aspects of the invention would have been obvious for the following reasons:

McMahon teaches applying partially cured rubber material (2:59-60) onto a substrate with an adhesive (3:1-2) and performing a final cure of the laminate (3:20-45). Although McMahon is also silent to an insert molding process, Eisinga further teaches that it is conventional to injection molding onto an insert (2:12-17), which is interpreted to be insertion molding.

It would have been prima facie obvious to one of ordinary skill in the art at the time of the invention to incorporate the methods of Eisinga and McMahon into that of Ozawa because (a) McMahon suggests the process for use with partially cured rubber, which is present in the Ozawa vulcanizate, or (b) Ozawa suggests the process steps demonstrated by McMahon, namely use of an adhesive on a substrate, application of an elastomeric or rubber material, and final curing, and (c) Ozawa suggests to mold the material in the same way that thermoplastics are normally molded (16:57-65), which would obviously include injection molding, which is provided by Eisinga.

As to Claims 30, 31, and 34, Ozawa teaches or suggests a fluoroplastic polyvinylidene fluoride (20:7), a twin screw for mixing (36:43, for example), and Ozawa teaches peroxide curing agents (28:65).

11. **Claim 32** is rejected under 35 U.S.C. 103(a) as being unpatentable over Ozawa (US 5910544) in view of McMahon (US 3432373), Eisinga (USPN 5792348), and further in view of Yokokawa (USPN 4094949). Ozawa, McMahon, and Eisinga teach the subject matter of Claim 29 above under 35 USC 103(a). **As to Claim 32**, Ozawa appears to be silent to the claimed copolymer, however, Yokokawa teaches copolymers of vinylidene fluoride (2:25-35, 4:41). It would have been prima facie obvious to one of ordinary skill in the art at the time of the invention to incorporate the method of Yokokawa into that of Ozawa because one of ordinary skill in the art would have viewed the materials disclosed in the similar method of Yokokawa as substitutable alternatives for those already disclosed by Ozawa.

12. **Claim 33** is rejected under 35 U.S.C. 103(a) as being unpatentable over Ozawa (USPN 5910544) in view of McMahon (US 3432373), Eisinga (USPN 5792348), and further in view of Kolb (USPN 3884877). Ozawa, McMahon, and Eisinga teach the subject matter of Claim 29 above under 35 USC 103(a). **As to Claim 27**, Ozawa is silent to the bisphenol curing agents. However, Kolb teaches that when curing fluoroelastomers (title) of vinylidene fluoride (4:55-56), it is known to use a bisphenol curative (8:63-69, 8:37-50). It would have been prima facie obvious to one of ordinary skill in the art at the time of the invention to incorporate the method of Kolb into that of Ozawa because (a) Ozawa teaches peroxide curing agents and fluororubbers, and Kolb teaches that bisphenols are very useful (8:69) for curing fluoroelastomer compositions (title), particularly vinylidene fluoride (4:55-56), therefore Kolb teaches a substitutable curing agent for the materials of Ozawa, or (b) doing so would provide the ability to vary the curing time and temperature (9:22-25).

Response to Arguments

13. Applicant's arguments filed 5 May 2008 have been fully considered but they are not persuasive or are moot in view of the new grounds of rejection above. The arguments appear to be on the following grounds:

(a) The independent claims have been amended to recite that the partial dynamic cure is carried out while mixing the materials above a melting point of the thermoplastic.

(b) Takeyama does not teach partially curing the elastomer by dynamic vulcanization.

(c) The Yokokawa and Ozawa references do not overcome the deficiencies of Takeyama.

14. These arguments are not persuasive or are moot for the following reasons:

(a-c) New rejections are set forth above over Ozawa. With respect to Applicants' assertion that there is no dynamic curing or crosslinking in the Ozawa reference, the Examiner respectfully disagrees. The argument does not consider column 20 or other portions of the Ozawa reference which refer to the interaction of the thermoplastic, the rubber, and the crosslinking agent. The only requirement found in the Ozawa reference is that the rubber is at least partially crosslinked (4:6-7). The crosslinking time may be from 15 seconds to 5 minutes (20:45-50) at a temperature above the melting temperature of the thermoplastic resin (20:44-45) and the dynamic cross-linking conditions (temperature and time) are suitably selected and not particularly limited (paragraph bridging columns 20 and 21). It is submitted that because these conditions are not significantly different from those of the instant application (30-90 seconds at 180 C, see page 36

of the specification), and are suggested to be optimizable, the partial degree of curing sought in this application would have been present in or obvious over the Ozawa reference.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MATTHEW J. DANIELS whose telephone number is (571)272-2450. The examiner can normally be reached on Monday - Friday, 8:00 am - 4:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Christina Johnson can be reached on (571) 272-1176. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Matthew J. Daniels/
Primary Examiner, Art Unit 1791
7/20/08